The grass on 1 acre in 1 week with what grows$=1+\frac{13}{90}=\frac{103}{90}$.
$\frac{227}{900}-\frac{13}{90}=\frac{97}{900}$, the amount of the standing grass eaten in 1 week.
$1\div\frac{97}{900}=\frac{900}{97}=9\frac{27}{97}$ weeks, the time required.

SOME INTERESTING RULES IN MULTIPLICATION.

BY MARY M. CURRIER, WENTWORTH, N. H.

RULE 1. To multiply one number by another, the multiplier consisting of two digits of which the left-hand digit is 1:

Multiply each figure of the multiplicand by the right-hand figure of the multiplier, and to each product add the figure of the multiplicand following the one multiplied.

Example 1. Multiply 1675 by 13.

$$1675\times13=21775$$

$$\begin{array}{ll r}
5\times3= & & 15\\
7\times3=21, & 21+1+5 & =27\\
6\times3=18, & 18+2+7 & =27\\
1\times3=3, & 3+2+6 & =11\\
 & 1+1 & =\ 2
\end{array}$$

Taking the digits in the units place in these several products beginning with the last, we have, $21775=13\times1675$.

Example 2. Multiply 40928 by 17.

$$\begin{array}{ll r}
8\times7= & & 56\\
2\times7=14, & 14+5+8 & =27\\
9\times7=63, & 63+2+2 & =67\\
0\times7=\ 0, & 0+6+9 & =15\\
4\times7=28, & 28+1+0 & =29\\
 & 2+4 & =\ 6
\end{array}$$

$\therefore\ 695776=17\times40926$.

RULE 2. To multiply one number by another, the multiplier consisting of three digits, of which the two at the left are ones:

Multiply each figure of the multiplicand by the right hand figure of the multiplier and to each product add the two figures following the one multiplied and the digit in the tens place of the preceding product.

Example 1. Multiply 340726 by 114.

$$\begin{array}{ll r}
6\times4= & & 24\\
2\times4=\ 8, & 8+2+6 & =16\\
7\times4=28, & 28+1+2+6 & =37\\
0\times4=\ 0, & 0+3+7+2 & =12\\
4\times4=16, & 16+1+0+7 & =24\\
3\times4=12, & 12+2+4+0 & =18\\
 & 1+3+4 & =\ 8\\
 & 3 & =\ 3
\end{array}$$

$\therefore\ 38842764=114\times340726$.

RULE 3. To multiply one number by another, the multiplier consisting of two digits of which the left hand digit is 2.

Multiply each figure of the multiplicand by the right-hand figure of the multiplier and to each product add twice the figures of the multiplicand following the one multiplied and the digit in tens place of the preciding product.

Example 1. Multiply 3495013 by 26.

$$\begin{array}{rr} 3\times6 & =18 \\ 1\times6=\ 6, & 6+1+2\times3=13 \\ 0\times6=\ 0, & 0+1+2\times1=\ 3 \\ 5\times6=30, & 30+0+2\times0=30 \\ 9\times6=54, & 54+3+2\times5=67 \\ 4\times6=24, & 24+6+2\times9=48 \\ 3\times6=18, & 18+4+2\times4=30 \\ & 3+2\times3=\ 9 \end{array}$$

$\therefore$ 90870338=26$\times$3495013.

From these three rules one may see how the principle may be carried further.

NOTE. We deem these rules of sufficient interest to merit publication in this department. It may be seen that they are results of a compact arrangement of the following method: Multiply 3492 by 117.

$$\begin{array}{r} 3492 \\ 117 \\ \hline 14 \\ 63. \\ 28.. \\ 21... \\ 3492. \\ 3492.. \\ \hline 408564 \end{array} \qquad \begin{array}{rr} 2\times7 & =14 \\ 9\times7=63, & 63+1+2\quad =66 \\ 4\times7=28, & 28+6+9+2=45 \\ 3\times7=21, & 21+4+4+9=38 \\ & 3+3+4=10 \\ & 1+\ 3=4 \\ \\ & \therefore\ 408564=117\times3492. \end{array}$$

EDITOR.

ALGEBRA.

139. Proposed by JOHN M. COLAW, A. M., Monterey, Va.

Solve neatly $\sqrt[4]{(m-x)}=\sqrt[4]{n}-\sqrt[4]{x}$.

Solution by J. H. DRUMMOND, LL. D., Portland, Me.

$(m-x)^{\frac{1}{4}}=n^{\frac{1}{4}}-x^{\frac{1}{4}}$ ....(1).

Put $n=p^4$ and $x=y^4$. Substituting these values in (1), raising to the fourth power, and reducing, we have

$$y^4-2py^3+3p^2y^2-2py^3=\frac{m-p^4}{2}.$$

By inspection we see that adding p^4 to the first member it becomes a perfect square. Adding p^4 to both members and extracting the square root we have

$$y^2-py+p^2=\pm\sqrt{\frac{m+p^4}{2}};\text{ then } y=\frac{p\pm[-3p^2\pm2\sqrt{(2m+2p^4)}]^{\frac{1}{2}}}{2}.$$

Restoring values of y and p, we have